

36 Looking for Signs of Micro-Life



If someone asked you what makes you sick, you might answer that germs, bacteria, or viruses make you sick. During the early 1900s, some people thought an infectious disease like the flu could be caused by nakedness, contaminated food, irritating gases in the atmosphere, unclean clothing, open windows, closed windows, old books, dirt, dust, or supernatural causes.

What does cause infectious diseases? You can begin to answer this question with the study of **microbes** (MY-krobz), another word for creatures that are too small to be seen with the human eye. Some of these microbes cause diseases. In this activity, you will look for aquatic (water) microbes. You can see some examples of microbes in the photographs below.

CHALLENGE

What kinds of microbes can you find?



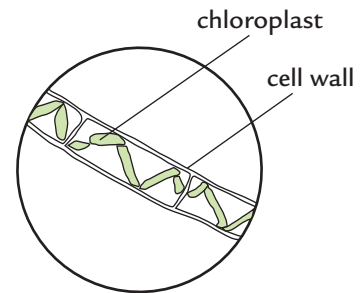
MICROSCOPE DRAWING MADE EASY

Below is a picture taken through a microscope of the alga *Spirogyra*. The diagram to the right shows what a biologist or biological illustrator might draw and how he or she would label the drawing. Did you know that some artists draw only scientific illustrations?

Some tips for better drawings:

- Use a sharp pencil and have a good eraser handy.
- Try to relax your eyes when looking through the eyepiece. You can cover one eye or learn to look with both eyes open. Try not to squint.
- Look through your microscope at the same time as you do your drawing. Look through the microscope *more* than you look at your paper.
- Don't draw every small thing on your slide. Just concentrate on one or two of the most common or interesting things.
- You can draw things larger than you actually see them. This helps you show all of the details you see.
- Keep written words outside the circle.
- Use a ruler to draw the lines for your labels. Keep lines parallel—do not cross one line over another.
- Remember to record the level of magnification next to your drawing.

Spirogyra (algae) x 400



MATERIALS



For each group of four students

- 1 bottle of methyl cellulose
- 1 plastic cup containing at least 10 mL of culture
- 1 plastic cup containing water



For each pair of students

- 1 microscope slide (single depression)
- 1 coverslip
- 1 dropper
- 1 microscope
- lens paper



For each student

- 1 Student Sheet 36.1, "Microbe Drawings"

PROCEDURE

1. Clean your microscope slide and coverslip by rinsing them with water and gently wiping them dry.
2. Use the dropper in the cup containing culture to place a drop of liquid from that cup onto your slide.
3. After placing a drop of the culture liquid on the slide, add one drop of methyl cellulose directly on top of the first drop. Be careful not to add more than one drop! The methyl cellulose will slow down the movement of the microbes.
4. Carefully touch one edge of the coverslip, at an angle, to the liquid on your slide (as shown in Figure 1). Slowly allow the coverslip to drop into place.

Figure 1: Placing the Coverslip



5. Be sure that your microscope is set on the lowest power (shortest objective) before placing your slide onto the microscope. Center the slide so that the specimen is directly over the light opening and adjust the microscope settings as necessary.



Hint: To check that you are focused on the material that is on the slide, move the slide slightly while you look through the eyepiece—the material that you are focused on should move at the same time you move the slide.

6. Begin by observing the sample on low power (usually the 4x objective). You may need to search the slide for signs of micro-life, or you may observe microbes moving through your field of view.

Hint: If material on the slide is too light to see, reduce the amount of light on the slide by slightly closing the diaphragm under the stage.

7. Without moving the slide (which can be secured with stage clips), switch to medium power (usually 10x). Adjust the microscope settings as you look again for signs of micro-life.
8. Without moving the slide, switch to high power (usually the 40x objective). *Be careful not to smash the objective against the slide!* Adjust the microscope settings as necessary. Search the slide for signs of micro-life. Some of the microbes may be very small, so look carefully!

Hint: If material on the slide is too dark to see, increase the amount of light on the slide: do this by slightly opening the diaphragm under the stage.

9. Review “Microscope Drawing Made Easy” on page C-28.
10. Either on medium or high power, draw at least two microbes.
11. When you have completed Step 10, turn off the microscope light and set the microscope back to low power (usually the 4x objective).

ANALYSIS



1. Is it possible that microbes exist that are smaller than those you observed? Explain how you might try to collect evidence to prove or disprove your idea.



2. As a scientist, you are asked to describe two of the microbes that you saw to someone who has never looked through a microscope. Write a short paragraph describing the microbes that you observed.
3. **Reflection:** Imagine that you are a researcher studying microbes. Would you choose to study a disease-causing microbe or one that does not cause disease? Explain.